Ref 3

FERROXCUBE, Div. of Amperex Electronic Corporation

Groundwater Quality Study;

Water Quality Analyses

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INTRODUCTION

Ferroxcube has prepared this report to supplement the geologic report submitted to the NYS Dept. of Environmental Conservation on May 4, 1983 and to fulfill the monitoring requirements of our SPDES permit.

The report contains procedures, data and recommendations prepared from research and information submitted by Dunn Geoscience Corp., Latham, NY and Envirotest Laboratories, Inc., Newburgh, NY. Results are reported from the analyses of five, recently installed, groundwater observation wells and the sanitary wastewater treatment system for Building #1 and a similar system for Building #2.

This report documents the progress which has been made in this groundwater quality study and establishes the need for additional research.

PROCEDURE

All laboratory analyses were conducted by Envirotest Laboratories. This laboratory is approved by New York State for chemical analysis. Sampling was performed by appropriate personnel from Ferroxcube, Envirotest Laboratories, and Dunn Geoscience Corp.

The groundwater sampling techniques are stated under Item 7 of the "Progress Report for Groundwater Quality Study" prepared by Dunn Geoscience Corp. and submitted by Ferroxcube. For your convenience, a copy of said item may be found in Appendix B.

The volatile organic compound,(hereinafter VOC), analyses were conducted using guidelines from the Federal Register 601 procedure for water analyses. All other analyses and sampling were performed in accordance with standard practices for water and wastewater analyses.

SUMMARY OF RESULTS

The following is a brief description of several items listed in the data presented in Appendix A:

1. There were no organic contaminants discovered in observation well #1d or well #1s.

SUMMARY OF RESULTS (con't.)

2. Observation well #1d exhibited a high pH value. Another series of analyses, designed to determine the probable cause for the pH, was performed. The results of these analyses proved unsuccessful in relating the pH value to any of the additional parameters.

3. There were essentially no organic contaminants found in observation well #2. A freon value of 1.1 µg/l was reported in the April sample. This was not considered significant, because the reported value was only 0.1 µg/l greater than the analytical detection limit.

4. VOCs were reported in well #3. Freon and 1,1,1-trichloroethane were the primary constituents found. Together, these compounds accounted for approximately 89% to 96% of the VOC total. It is important to note, that the three sets of analyses performed on well #3 show a dramatic decrease in VOC results, with the exception of tetrachloroethylene.

5. The concentration of manganese for well #3 was reported in the 0.7 mg/l range, however, iron and zinc were below detectable limits.

6. VOCs were reported in observation well #4, although the values were up to six hundred times less than those reported for well #3. The primary constituents were again freon and 1,1,1-trichloroethane.

7. A high concentration of VOCs was reported for the Building #2 septic tank sludge sample. The primary constituent was tetrachloroethylene at approximately 69% of the total VOC content.

8. Only trace levels of VOCs were reported for the Building #1 septic tank sludge sample.

DISCUSSION

The data presented in this report indicate that VOCs are present in well #3 and in a much smaller amount in well #4. All of the wells can be located on the facility drawing found in Appendix C. The presence of VOCs have been confirmed in each of the analyses, however, the actual quantity of each compound is questionable.

The high values reported for VOCs in the first analysis of well #3 have been attributed to the sampling of an underdeveloped well. As reported by Dunn Geoscience Corp., a new well must be allowed sufficient time to stabilize. Components may be removed from or placed into the groundwater during well installation. In addition, the groundwater must be allowed to return to its normal undisturbed path. This theory appears to be supported by the diminution of the VOC values reported for well #3 during the testing period.

The source of VOCs has not been fully explained to our satisfaction at this time. One possible source is the Building #2 sanitary wastewater treatment system. This system is designed with a steel septic tank followed by a pump wet well, grease trap, subsurface sand filter and chlorine contact tank. This sanitary system is positioned hydraulically upgradient of well #3 and the north-east end of the sand filter is within ten feet of well #4.

High levels of VOCs are reported in the most recent analysis of the Building #2 septic tank. It is presumed that the contamination discovered in the septic tank is not from any recent chemical handling operation, since over ninety percent of all solvents we use are used in Building #1 and the Building #1 sanitary wastewater treatment system septic tank is relatively clean, according to the data.

The data collected to date has not answered many of the questions which would normally accompany a study of this nature. The following items remain to be determined: 1) source(s) of contamination, 2) extent of contamination and areal impact, and 3) VOC flow direction. Additionally, the source of contaminants discovered in the domestic well formerly owned by Mr. Kniceley is still unknown. Thus, additional research must be performed in order to sufficiently address these questions.

RECOMMENDATIONS

In general, additional subsurface exploration and analyses are recommended. The following is a more detailed list of recommendations based on the information presented herein:

1. A minimum of five new observation wells should be installed on the Ferroxcube site. The suggested location of each well is shown on the drawing which may be found in Appendix C. Three of the wells will be located on the main site and two located on the parcel formerly owned by Mr. Kniceley. Their location will be upgradient and downgradient of possible contamination sources, namely the Building #2 sanitary wastewater treatment system and the Mudderkill.

2. Additional laboratory analyses should be performed on samples from each of the following: the new observation wells, the existing observation wells, the former Kniceley well, the Ferroxcube potable water well #4 and #5, the Building #1 sanitary wastewater treatment system and the Building #2 sanitary wastewater system. The samples should include both water and/or soil when deemed appropriate. The following is a suggested list of test parameters:

a. pH	f. 1,1,1-trichloroethane
b. Iron	g. 1,1-dichloroethane
c. Manganese	h. Tetrachloroethylene
d. Zinc	i. Trichloroethylene
e. Total freon	j. Methylene chloride

3. Additional groundwater level measurements should be taken to identify any seasonal fluctuations.

4. The Building #2 septic tank and all associated tankage will be cleaned immediately. This service will be performed by an approved hazardous waste disposal firm, due to the presence of the VOCs. (Scheduled for 6/18/83)

These recommendations have been designed to help define the areal extent of the VOCs contained in the groundwater and to identify possible sources. The implementation of these steps should provide the necessary information required to formulate an appropriate strategy in the event of additional remedial action.

APPENDIX A

INDEX OF TABLES

TABLE 1

RESULTS OF WATER QUALITY ANALYSES

Observation Well No. 1d

Parameters (units)	Sampling Date	
	3/15/83	4/21/83
pH (standard)	12	11.7
Temperature (^{o}C)	11.2	
Eh (mv)	126	
Specific Conductance (µmhos @ 25^{o}C)	3500	1600
Iron (mg/l)	<0.05	0.15
Manganese (mg/l)	<0.05	<0.05
Zinc (mg/l)	<0.05	<0.05
Chemical Oxygen Demand (mg/l)	7.9	-
Chloride (mg/l)	100	130
Total Organic Carbon (mg/l)	7.0	-
1,1,1-dichloroethane (µg/l)	<1	<1
1,2-dichloroethane (µg/l)	<1	<1
Methanol (mg/l)	<1	<1
Tetrachloroethylene (µg/l)	<1	<1
1,1,1-trichloroethane (µg/l)	<1	<1
Trichloroethylene (µg/l)	<1	<1
Total Freon (µg/l)	<1	<1
Total Organic Halogens (µg/l Lindane)	<0.5	-
Alkalinity (mg/l)	-	420
Aluminum (mg/l)	-	1.1
Calcium (mg/l)	-	46
Copper (mg/l)	-	<0.05
Fluorine (mg/l)	-	0.55
Magnesium (mg/l)	-	<1.0
Nitrogen, ammonia (mg/l)	-	2.8
Nitrogen, nitrate (mg/l)	-	0.9
Nitrogen, nitrite (mg/l)	-	0.008
Orthophosphate (mg/l)	-	0.28
Potassium (mg/l)	-	11
Silica (mg/l)	-	6.3
Sodium (mg/l)	-	56
Sulfate (mg/l)	-	19

TABLE 2

RESULTS OF WATER QUALITY ANALYSES

Observation Well No. 1s

Parameters (units)	Sampling Date	
	3/15/83	4/21/83
pH (standard)	7.8	-
Temperature (^{o}C)	12	-
Eh (mv)	394	-
Specific Conductance (µmhos @ 25^{o}C)	880	-
Iron (mg/l)	<0.05	-
Manganese (mg/l)	<0.05	-
Zinc (mg/l)	<0.05	-
Chemical Oxygen Demand (mg/l)	20	-
Chloride (mg/l)	100	-
Total Organic Carbon (mg/l)	30	-
1,1-dichloroethane (µg/l)	<1	<1
1,2-dichloroethane (µg/l)	<1	<1
Methanol (mg/l)	<1	-
Methylene chloride (µg/l)	<1	<1
Tetrachloroethylene (µg/l)	<1	<1
1,1,1-trichloroethane (µg/l)	<1	<1
Trichloroethylene (µg/l)	<1	<1
Total freon (µg/l)	<1	<1
Total Organic halogens (µg/l Lindane)	<0.5	-

TABLE 3

RESULTS OF WATER QUALITY ANALYSES

Observation Well No. 2

Parameters (units)	Sampling Date	
	3/15/83	4/21/83
ph (standard)	8.3	-
Temperature (^{o}C)	11.5	-
Eh (mv)	369	-
Specific Conductance (µmhos @ 25^{o}C)	430	-
Iron (mg/l)	<0.05	-
Manganese (mg/l)	0.07	-
Zinc (mg/l)	<0.05	-
Chemical Oxygen Demand (mg/l)	20	-
Chloride (mg/l)	14	-
Total Organic Carbon (mg/l)	16	-
1,1-dichloroethane (µg/l)	<1	<1
1,2-dichloroethane (µg/l)	<1	<1
Methanol (mg/l)	<1	<1
Methylene chloride (µg/l)	<1	<1
Tetrachloroethylene (µg/l)	<1	<1
1,1,1-trichloroethane (µg/l)	<1	<1
Trichloroethylene (µg/l)	<1	<1
Total Freon (µg/l)	<1	1.1
Total organic halogens (µg/l Lindane)	<0.5	-

TABLE 4

RESULTS OF WATER QUALITY ANALYSES

Observation Well No. 3

Parameters (units)	Sampling Date		
	3/15/83	4/21/83	5/19/83
pH (standard)	7.0, 6.8	-	-
Temperature (^{o}C)	10.9	-	-
Eh (mv)	388	-	-
Specific Conductance (µmhos @ 25^{o}C)	485	-	-
Iron (mg/l)	<0.05	-	-
Manganese (mg/l)	0.72, 0.77	-	-
Zinc (mg/l)	<0.05	-	-
Chemical Oxygen Demand (mg/l)	12, 16	-	-
Chloride (mg/l)	52, 62	-	-
Total Organic Carbon (mg/l)	29, 21	-	-
1,1-dichloroethane (µg/l)	440, 600	93	34
1,2-dichloroethane (µg/l)	<10	<20	<10
Methanol (mg/l)	<1	-	-
Methylene chloride (µg/l)	45, 39	4.8	-
Tetrachloroethylene (µg/l)	250, 350	18	160
1,1,1-trichloroethane (µg/l)	14,000	1700	630
Trichloroethylene (µg/l)	1300, 1800	150	170
Total freon (µg/l)	23,000, 24,000	4000	2200
Total organic halogens (µg/l Lindane)	1.5, 0.84	-	-

NOTES: 1. Duplicate sample results shown if they differ.

TA E 5

RESULTS OF WATER QUALITY ANALYSES

Observation Well No. 4

Parameters (units)	Sampling Date		
	3/15/83	4/21/83	5/19/83
pH (standard)	7.3	-	-
Temperature (^{o}C)	11.0	-	-
Eh (mv)	371	-	-
Specific Conductance (µmhos @ 25^{o}C)	440	-	-
Iron (mg/l)	<0.05	-	-
Manganese (mg/l)	<0.05	-	-
Zinc (mg/l)	<0.05	-	-
Chemical Oxygen Demand (mg/l)	24	-	-
Chloride (mg/l)	49	-	-
Total Organic Carbon (mg/l)	22	-	-
1,1-dichloroethane (µg/l)	1.8	<1	<1
1,2-dichloroethane (µg/l)	<1	<1	<1
Methanol (mg/l)	<1	-	-
Methylene chloride (µg/l)	<1	<1	-
Tetrachloroethylene (µg/l)	11	<1	17
1,1,1-trichloroethane (µg/l)	13	1.8	5.9
Trichloroethylene (µg/l)	3.7	<1	2.4
Total freon (µg/l)	33	1.5	20
Total organic halogens (µg/l Lindane)	<0.5	-	-

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RESULTS OF WATER QUALITY ANALYSES

Bldg. #2 Sanitary System, Final Effluent

Parameters (units)	Sampling Date		
	12/7/82	12/8/82	12/9/82
1,1-dichloroethane (µg/l)	4.4	4.2	3.8
methylene chloride (µg/l)	5.0	2.4	1.2
tetrachloroethylene (µg/l)	<1	<1	1.3
trans-1,2-dichloroethylene (µg/l)	<1	<1	<1
1,1,1-trichloroethane (µg/l)	1.9	3.0	1.6
trichloroethylene (µg/l	<1	<1	<1
1,1,2-trichloro-2,2,1-trifluoroethane (µg/l)	<1	<1	<1

TABLE 7

RESULTS OF WATER QUALITY ANALYSES

Bldg. #2 Sanitary System, Septic Tank Effluent

Parameters (units)	Sampling Date	
	12/14/82	5/25/83
1,1-dichloroethane (µg/l)	5.8	61
methylene chloride (µg/l)	2.2	-
tetrachloroethylene (µg/l)	<1	<1
trans-1,2 - dichloroethylene (µg/l)	<1	-
1,1,1-trichloroethane (µg/l)	6.2	1200
trichloroethylene (µg/l)	< 1	< 1
1,1,2-trichloro-2,2,1-trifluoroethane (µg/l)	23	3.0
1,2-dichloroethane (µg/l)	-	1.7

RESULTS OF WATER QUALITY ANALYSES

Bldg. #2 Sanitary System, Septic Tank Sludge

Parameters (units)	Sampling Date
	5/25/83
1,1-dichloroethane (µg/l)	7400
tetrachloroethylene (µg/l)	28400
1,1,1-trichloroethane (µg/l)	6500
trichloroethylene (µg/l)	1200
1,1,2-trichloro-2,2,1-trifluoroethane (µg/l)	4600
1,2-dichloroethane (µg/l)	< 20

T LE 9

RESULTS OF WATER QUALITY ANALYSES

Bldg. #1 Sanitary System, Septic Tank Effluent

Parameters (units)	Sampling Date	
	12/14/82	5/25/83
1,1-dichloroethane (µg/l)	4.9	<5
methylene chloride (µg/l)	5.6	-
tetrachloroethylene (µg/l)	<1	<1
trans-1,2-dichloroethylene (µg/l)	<1	-
1,1,1-trichloroethane (µg/l)	<1	<5
trichloroethylene (µg/l)	<1	<2
1,1,2-trichloro-2,2,1-trifluoroethane (µg/l)	69	<5
1,2-dichloroethane (µg/l)	-	<5

TABLE 10

RESULTS OF WATER QUALITY ANALYSES

Bldg. #1 Sanitary System, Septic Tank Sludge

Parameter (units)	Sampling Date
	5/25/83
1,1-dichloroethane (µg/l)	2.3
tetrachloroethylene (µg/l)	< 1
1,1,1-trichloroethane (µg/l)	2.2
trichloroethylene (µg/l)	< 1
1,1,2-trichloro-2,2,1-trifluoroethane (µg/l)	2.3
1,2-dichloroethane (µg/l)	< 1

APPENDIX B

7.0 GROUND-WATER QUALITY

Some preliminary ground-water samples were collected with new PVC bailers on March 15, 1983. A different bailer was used for sampling each well to avoid the possibility of cross-contamination. In addition, each well was bailed-to-waste prior to sampling. One of the wells, #3, was arbitrarily sampled twice to serve as a duplicate to evaluate laboratory quality control. Immediately after sampling, field measurements of four chemical parameters were made with portable field testing equipment and the samples were delivered to the testing laboratory.

1. "Progress Report For Ground Water Quality Study", Dunn Geoscience, 1983.

APPENDIX C

N

WELL #4

WELL #5

HOUSE

BLDG. 1

SEPTIC

BLDG. 2

BARN

PUMP AND CHLOR. HSE

FILTRE BED #1

F.D. #2

BLDG. 1 SYS.

SEPTIC

PUMP AND CHLOR. HSE

#3

F.D. #3

F.D. #4

BLDG. 2 SYS.

#1 #2 #D

EXISTING OBSERVATION WELLS (5)

HOUSE

BLDG. 3

BLDG. 3A

HOUSE

PROPOSED OBSERVATION WELLS (5)

DOM. WELL

REV.	ECO	DESCRIPTION	DRFT.	DATE	APPD.

REVISIONS

APPLICABLE SPECS

DRAWING CLASS

MATERIAL

Tolerances Unless Otherwise Indicated

3 PL. ±
2 PL. ±
FRACT. ±
ANGLE ±

FINISH

FERROXCUBE
DIVISION OF AMPEREX ELECTRONIC CORP.

TITLE OBSERVATION WELLS

DRAWN BY	DATE	SIZE	PART NO.	REV.
ZM	6.16.83	4	26-00-0269	000
CHKD BY				
APPRVD BY		SCALE 1" = 60'	SHEET 1 OF 1	

BRUNING 40-21 26836-9